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GIFFORD PINCHOT, Forester.

SILVICAL LEAFLET 16.

SINGLE-LEAF PIÑON.

*Pinus monophylla* Torr. and Frem.

Single-leaf piñon is a small tree of the arid Southwest. It is employed to some extent for fuel and minor uses, but is of little importance commercially. It is best known on account of its edible, nut-like seeds.

RANGE AND OCCURRENCE.

Single-leaf piñon is found in Nevada, western Utah and Arizona, southern California, and northern Lower California, and in the Rocky, Sierra Nevada, and southern Coast Range mountains.

It is an inhabitant of arid situations on foothills, mesas, and mountains throughout its range. In Utah and western Colorado it grows on dry, gravelly mesas and rocky slopes; in the Sierra Nevada Mountains and the mountains of southern California it is most abundant on slopes facing the desert.

Its altitudinal range in western Utah and Nevada is reported to be from 3,800 to 6,800 feet; on desert ranges in central and western California it is from 3,000 feet in the San Rafael Mountains to 9,000 feet along the summit of the Panamint range. Along the eastern slope of the Sierra Nevada Mountains it extends from 6,000 to 8,000 feet. In southern California the tree is abundant in the San Bernardino Mountains, and reaches down to 4,000 feet on northern slopes, and up to 9,500 feet on slopes east of the main range; in the San Jacinto Mountains it grows below 5,800 feet on eastern slopes; and in the San Gabriel Mountains it extends up to 7,500 feet.

CLIMATE.

Single-leaf piñon endures conditions of great aridity, characterized by high temperature, rapid evaporation, light precipitation, and a low degree of humidity. The precipitation varies from a maximum of about 16 inches in the northern portion of its range to less than 5 inches in the southern portion. Snowfall sometimes reaches 4 feet in the Sierras, but is often absent or very slight. The temperature ranges from a minimum of  $-2^{\circ}$  Fahrenheit in the Sierra Nevada Mountains to  $122^{\circ}$  Fahrenheit in the Mojave desert. In the desert mountains of Nevada and southeastern California it passes through a period of combined moisture and heat from February to May, of extreme drought from June to November, and of cold during December and January.

#### ASSOCIATED SPECIES.

It usually grows in mixture with other species, but frequently forms pure, open stands over large areas. Its chief associate in the north is Utah juniper, with which it forms open stands on mountains in the Great Basin. In the San Francisco Mountains of Arizona it is found in mixture with *Pinus edulis*, alligator and one-seed juniper, and Arizona cypress. In southern California it occurs sparingly in the chaparral formations, together with California juniper, oaks, and tree yuccas. In the San Bernardino Mountains it is usually found in mixture with western juniper and mountain mahogany, forming a low, somewhat open stand; on the desert slope it often grows with white fir, and on the more rocky southern exposures with Jeffrey pine. Pure stands are not infrequent here.

#### HABIT.

The tree very rarely reaches large size, although individuals have been seen in the Tehachapi Mountains 4 feet in diameter and nearly 100 feet in height. The average mature dimensions are from 25 to 30 feet in height, and from 14 to 18 inches in diameter. The needles are short, dark green, fairly close set, and resemble spruce foliage at a little distance. Frequently the crown is rounded and squat, with branches to within 3 or 4 feet of the ground. In the Sierras the trees occasionally assume a more slender, spire-like form, with clearer bole. The wood is hard, pitchy, and fine-grained. The growth is slow and even. The cones are round with large, edible, nut-like seed.

#### SOIL AND MOISTURE.

Its soil moisture and soil quality requirements are about the same as those of the juniper and chaparral with which it associates, and are less than those of the other conifers within its range. It occurs most commonly on coarse, gravelly soils, on the shallow deposits overlying strata of granite, limestone, or shale, or on the steeper slopes, where it clings to the rocks themselves, with no soil but a coarse talus.

#### TOLERANCE.

It is very intolerant, and demands a great amount of sunlight throughout its life. Seedlings seem to do better if they are protected from the hot sun until they are about 2 feet high.

#### REPRODUCTION.

It bears seed abundantly nearly every year. The seeds are large and wingless, not adapted for wind distribution, and, except when they are carried by animals, seldom get far from the parent tree. Reproduction is never dense, but is usually very open or scattered. The seeds are eaten in large quantities by men and animals.